<110> THE HORTICULTURE AND FOOD RESEARCH INSTITUTE OF NEW ZEALAND LIMITED

<120> ENZYMES AND POLYNUCLEOTIDES ENCODING THE SAME

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<150> NZ 523384
<151> 2002-12-24

<160> 16

<170> PatentIn version 3.1

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His Pro Ser Ile Trp Gly Asp His Phe Leu Ala Tyr Ser Ser Asp Ala
            35                  40                  45

Met Glu Glu Glu Val Ile Asn Met Glu Gln Gln Gln Arg Leu His His
    50                  55                  60

Leu Lys Gln Lys Val Arg Lys Met Leu Glu Ala Ala Ala Glu Gln Ser
65                  70                  75                  80

Ser Gln Met Leu Asn Leu Val Asp Lys Ile Gln Arg Leu Gly Val Ser
                85                  90                  95

Tyr His Phe Glu Thr Glu Ile Glu Thr Ala Leu Arg His Ile Tyr Lys
            100                 105                 110

Thr Cys Asp Tyr His Phe Asp Asp Leu His Thr Ala Ala Leu Ser Phe
        115                 120                 125

Arg Leu Leu Arg Gln Gln Gly Tyr Pro Val Ser Cys Asp Met Phe Asp
    130                 135                 140

Lys Phe Lys Asn Ser Lys Gly Glu Phe Gln Glu Ser Ile Ile Ser Asp
145                 150                 155                 160

Val Gln Gly Met Leu Ser Leu Tyr Glu Ala Thr Cys Leu Arg Ile His
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Gly Glu Asp Ile Leu Asp Glu Ala Leu Ala Phe Thr Ile Thr Gln Leu
            180                 185                 190

Arg Ser Ala Leu Pro Asn Leu Ser Thr Pro Phe Lys Glu Gln Ile Ile
        195                 200                 205

His Ala Leu Asn Gln Pro Ile His Lys Gly Leu Thr Arg Leu Asn Ala
    210                 215                 220

Arg Ser His Ile Leu Phe Phe Glu Gln Asn Asp Cys His Ser Lys Asp
225                 230                 235                 240

Leu Leu Asn Phe Ala Lys Leu Asp Phe Asn Leu Leu Gln Lys Leu His
                245                 250                 255

Gln Arg Glu Leu Cys Glu Ile Thr Arg Trp Trp Lys Asp Leu Asn Phe
            260                 265                 270
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Page 3

Ala Lys Thr Leu Pro Phe Ala Arg Asp Arg Met Val Glu Cys Tyr Phe
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Met Leu Thr Lys Val Ile Ala Met Ile Ser Ile Ile Asp Asp Ile Tyr
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Asp Val Tyr Gly Thr Leu Glu Glu Leu Val Leu Phe Thr Asp Ala Ile
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Glu Arg Trp Glu Ile Ser Ala Leu Asp Gln Leu Pro Glu Tyr Met Lys
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Leu Cys Tyr Gln Ala Leu Leu Asp Val Tyr Ser Met Ile Asp Glu Glu
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Met Lys Ile Leu Val Arg Ala Tyr Phe Glu Glu Ala Lys Trp Phe His
385   390   395   400

Gln Gly Tyr Val Pro Thr Met Glu Glu Tyr Met Gln Val Ala Leu Val
          405   410   415

Thr Ala Gly Tyr Lys Met Leu Ala Thr Ser Ser Phe Val Gly Met Gly
          420   425   430

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Ile Val Gln Ala Ala Ser Val Ile Gly Arg Leu Lys Asp Asp Ile Val
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Gly His Lys Phe Glu Gln Lys Arg Gly His Val Ala Ser Ala Val Glu
465   470   475   480

Cys Tyr Ser Lys Gln His Gly Thr Thr Glu Glu Glu Ala Ile Ile Glu
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Leu Cys Pro Ile Lys Val Pro Met Pro Leu Leu Ala Arg Val Leu Asn
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<213> Actinidia deliciosa

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            20                  25                  30


His Pro Ser Ile Trp Gly Asp His Phe Leu Ala Tyr Ser Ser Asp Ala
        35                  40                  45


Met Glu Glu Glu Asp Ile Asn Met Glu Gln Gln Gln Arg Leu His His
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50   55   60

Leu Lys Gln Lys Val Arg Lys Met Leu Glu Ala Ala Glu Gln Ser
65   70   75   80

Ser Gln Met Leu Asn Leu Val Asp Lys Ile Gln Arg Leu Gly Val Ser
                85   90   95

Tyr His Phe Glu Thr Glu Ile Glu Thr Ala Leu Arg His Ile Tyr Lys
                100   105   110

Thr Cys Asp Tyr His Phe Asp Asp Leu His Thr Ala Ala Leu Ser Phe
            115   120   125

Arg Leu Leu Arg Gln Gln Gly Tyr Pro Val Ser Cys Asp Met Phe Asp
    130   135   140

Lys Phe Lys Asn Ser Lys Gly Glu Phe Gln Glu Ser Ile Ile Ser Asp
145   150   155   160

Val Arg Gly Met Leu Ser Leu Tyr Glu Ala Thr Cys Leu Met Ile His
                165   170   175

Gly Glu Asp Ile Leu Asp Glu Ala Leu Ala Phe Thr Ile Thr Gln Leu
                180   185   190

Arg Ser Ala Leu Pro Asn Leu Ser Thr Pro Phe Lys Glu Gln Ile Ile
        195   200   205

His Ala Leu Asn Gln Pro Ile His Lys Gly Leu Thr Arg Leu Asn Ala
    210   215   220

Arg Ser His Ile Leu Phe Phe Glu Gln Asn Asp Cys His Ser Lys Asp
225   230   235   240

Leu Leu Asn Phe Ala Lys Leu Asp Phe Asn Leu Leu Gln Lys Leu His
                245   250   255

Gln Arg Glu Leu Cys Glu Ile Thr Arg Glu Ile Ser Ala Leu Asp Gln
                260   265   270

Leu Pro Glu Tyr Met Lys Leu Cys Tyr Gln Ala Leu Leu Asp Val Tyr
        275   280   285

Ser Met Ile Asp Glu Glu Met Ala Lys Gln Gly Arg Ser Tyr Cys Val
    290   295   300

Page 8

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Asp Tyr Ala Lys Ser Ser Met Lys Ile Leu Val Arg Ala Tyr Phe Glu
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Glu Ala Lys Trp Phe His Gln Gly Tyr Val Pro Thr Met Glu Glu Tyr
            325             330             335

Met Gln Val Ala Leu Val Thr Ala Gly Tyr Lys Met Leu Ala Thr Ser
            340             345             350

Ser Phe Val Gly Met Gly Glu Leu Ala Thr Lys Glu Ala Phe Asp Trp
        355             360             365

Val Ser Asn Asp Pro Leu Ile Val Gln Ala Ala Ser Val Ile Gly Arg
    370             375             380

Leu Lys Asp Asp Ile Val Gly His Lys Phe Glu Gln Lys Arg Gly His
385             390             395             400

Val Ala Ser Ala Val Glu Cys Tyr Ser Lys Gln His Gly Thr Thr Glu
            405             410             415

Glu Glu Ala Ile Ile Glu Leu Tyr Lys Gln Val Thr His Ser Trp Lys
            420             425             430

Asp Met Asn Ala Glu Cys Leu Cys Pro Thr Lys Val Pro Met Pro Leu
        435             440             445

Leu Ala Arg Val Leu Asn Leu Ala Arg Val Leu Tyr Val Ile Tyr Gln
    450             455             460

Asp Ala Asp Gly Tyr Thr His Ser Gly Thr Lys Val Lys Asn Phe Val
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His Pro Ser Ile Trp Gly Asp His Phe Leu Ala Tyr Ser Ser Asp Ala
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Met Glu Glu Glu Asp Ile Asn Met Glu Gln Gln Gln Arg Leu His His
50   55   60

Leu Lys Gln Lys Val Arg Lys Met Leu Glu Ala Ala Ala Lys Gln Ser
65   70   75   80

Ser Gln Met Leu Asn Leu Val Asp Lys Ile Gln Arg Leu Gly Val Ser
85   90   95

Tyr His Phe Glu Thr Glu Ile Glu Thr Ala Leu Arg His Ile Tyr Lys
100   105   110

Thr Cys Asp Tyr His Phe Asp Asp Leu His Thr Ala Ala Leu Ser Phe
115   120   125

Arg Leu Leu Arg Gln Gln Gly Tyr Pro Val Ser Cys Asp Met Phe Gly
130   135   140

Lys Phe Lys Asn Cys Lys Gly Glu Phe Gln Glu Ser Ile Ile Ser Asp
145   150   155   160

Val Arg Gly Met Leu Ser Leu Tyr Glu Ala Thr Cys Leu Arg Ile Arg
165   170   175

Gly Glu Asp Ile Leu Asp Glu Ala Leu Ala Phe Thr Thr Thr Gln Leu
180   185   190

Gln Ser Ala Leu Pro Asn Leu Ser Thr Pro Ile Lys Glu Gln Ile Ile
195   200   205

His Ala Leu Asn Gln Pro Ile His Lys Trp Leu Thr Arg Leu Asp Ala
210   215   220

Arg Arg His Ile Leu Phe Phe Glu Gln Asn Asp Cys His Gly Lys Asp
225   230   235   240

Leu Leu Asn Phe Ala Lys Leu Asp Phe Asn Ser Leu Gln Lys Leu His
245   250   255

Gln Arg Glu Leu Cys Glu Ile Thr Arg Trp Trp Lys Asp Leu Asp Phe
260   265   270

Ala Lys Lys Leu Pro Phe Ala Arg Asp Arg Met Val Glu Cys Tyr Phe
      275   280   285

Trp Ile Leu Gly Val Tyr Phe Glu Pro Gln Tyr Leu Arg Ala Arg Arg
    290   295   300

Met Leu Thr Lys Val Ile Ala Leu Thr Ser Ile Ile Asp Asp Ile Tyr
305   310   315   320

Asp Val Tyr Gly Thr Leu Glu Glu Leu Val Leu Phe Thr Asp Ala Ile
         325   330   335

Glu Arg Trp Glu Ile Ser Ala Leu Asp Asn Leu Pro Asp Tyr Met Lys
         340   345   350

Leu Cys Tyr Gln Ala Leu Leu Asp Val Tyr Ser Met Ile Asp Glu Glu
      355   360   365

Met Ala Lys Gln Gly Arg Ser Tyr Cys Val Asp Tyr Ala Lys Ser Ser
    370   375   380

Met Lys Ile Leu Val Arg Ala Tyr Phe Glu Glu Ala Lys Trp Phe His
385   390   395   400

Gln Gly Tyr Val Pro Thr Met Glu Glu Tyr Met Gln Val Ala Leu Val
         405   410   415

Thr Ala Gly Tyr Lys Met Leu Ala Thr Ser Ser Phe Val Gly Met Gly
         420   425   430

Glu Leu Ala Thr Lys Glu Ala Phe Asp Trp Val Ser Asn Asp Pro Leu
      435   440   445

Ile Val Gln Ala Ala Ser Val Ile Gly Arg Leu Lys Asp Asp Ile Val
    450   455   460

Gly His Lys Phe Glu Gln Lys Arg Gly His Val Ala Ser Ala Val Glu
465   470   475   480

Cys Tyr Ser Lys Gln His Gly Thr Ile Glu Glu Glu Ala Ile Ile Glu
         485   490   495

Leu Asp Lys Gln Val Thr His Ser Trp Lys Asp Ile Asn Ala Glu Cys
         500   505   510

Leu Cys Pro Ile Lys Val Pro Met Pro Leu Leu Ala Arg Val Leu Asn

Page 11

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          515                    520                  525
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Leu Ala Arg Val Leu Tyr Val Ile Tyr Gln Asp Glu Asp Gly Tyr Thr
     530                    535                  540
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<213> Actinidia chinensis

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<213> Actinidia chinensis

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            20              25              30
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Glu Glu Tyr Met Gln Val Ala Ile Val Thr Gly Ala Tyr Lys Ile Leu
        35              40              45
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Ala Thr Thr Ser Phe Val Gly Met Gly Glu Leu Ala Thr Lys Glu Val
    50              55              60
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Phe Asp Trp Val Ser Asn Asp Pro Leu Ile Val Gln Ala Ala Ser Ile
65              70              75              80
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Val Ser Arg Leu Thr Asp Asp Ile Val Gly His Lys Phe Glu Gln Lys
            85              90              95
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Arg Gly His Val Ala Ser Ala Val Glu Cys Tyr Met Lys Gln His Gly
            100             105             110
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Thr Thr Glu Glu Glu Ala Ile Val Glu Leu Tyr Lys Gln Val Thr Asn
        115             120             125
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Ala Trp Lys Asp Met Asn Ala Glu Cys Leu Phe Pro Thr Lys Val Pro
    130             135             140
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Met Pro Leu Leu Val Arg Val Leu Asn Leu Ala Arg Val Ile Asn Val
145             150             155             160
```

```
Leu Tyr Lys Asp Glu Asp Gly Tyr Thr His Ser Arg Thr Lys Val Lys
            165             170             175
```

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Lys Phe Val Thr Ser Val Leu Val Asp Phe Val Pro Ile Ser
            180             185             190
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<212> DNA

<213> Vaccinium corymbosum

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Ser Phe Val Gly Met Gly Asp Leu Val Thr Lys Glu Ala Phe Glu Trp
        35                  40                  45


Val Ser Ser Asp Pro Leu Ile Val Glu Ala Ala Ser Val Ile Cys Arg
    50                  55                  60


Leu Met Asp Asp Met Ala Gly His Lys Phe Glu Gln Glu Arg Gly His
65                  70                  75                  80


Val Ala Ser Ala Val Glu Cys Tyr Met Lys Gln His Gly Ala Thr Gln
                85                  90                  95


Glu Val Val Leu Leu Glu Phe Lys Lys Arg Val Thr Asn Ala Trp Lys
            100                 105                 110
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Asp Met Asn Ala Glu Cys Leu Arg Pro Thr Ala Val Pro Met Pro Leu
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Leu Thr Arg Val Leu Asn Leu Ala Arg Val Ile Asn Val Ile Tyr Lys
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Asp Glu Asp Gly Tyr Thr His Ser Gly Thr Lys Leu Lys Asn Phe Val
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